allied forms or species by descent from a common ancestor."

Besides the "Enumeratio," Thwaites published subsequently a few papers on detailed points in Ceylon botany.

His tenure of office was associated with some of the most important developments of the Ceylon planting industry. In 1861 and subsequent years he took an active part in the operations undertaken by the Government of India, in concert with the Royal Gardens, Kew, for the introduction of Cinchona into the East. From the first the enterprise succeeded in Ceylon beyond expectation, and in 1869 the first ton of bark grown in the island was sent to England for sale. In 1864 he began to urge the cultivation of tea, and in 1868 a sample, manufactured in Ceylon, was sent to this country. Cocoa was similarly brought forward in 1867, and it now bids fair to be one of the most important of Ceylon staples. Liberian coffee was introduced from Kew in 1873. In 1876 the plants of Para, Ceara, and Central American india-rubber plants, obtained for the Indian Government, were sent from Kew, where they had been propagated, to Dr. Thwaites' charge in Ceylon, which was made the depôt, for their subsequent distribution to India.

During the later years of his life Dr. Thwaites had been in weakly health, and lived latterly a retired and extremely abstemious life. But his singularly refined and cultivated mind always gave him a position of distinction in Ceylon society, and he enjoyed the esteem and personal friendship of successive governors. He became a Fellow of the Linnean Society in 1854, and of the Royal Society in 1865; and in 1878 the Crown conferred upon him the Companionship of St. Michael and St. George, in recognition of his long services. Two years afterwards he retired, and took up his abode near Kandy, being unable to persuade himself to leave the island where so much of his life had been continuously spent. He died on September 11, and was followed to the grave on the following day by a large assemblage and the members of the Peradeniya Garden Staff, including the coolie labourers.

W. T. T. D.

ELEVATION OF THE SIERRA MADRE MOUNTAINS

DURING the past summer, in travelling across the Sierra Madre Mountains from Parral in the southern part of the State of Chihuahua, Mexico, to the mining town of Guadalupe y Calvo, on the Pacific slope about one hundred and fifty miles from the Gulf of California, some observations were taken with a small pocket aneroid barometer with thermometer attached, which may be of interest to the readers of NATURE. Both barometer and thermometer had been carefully compared with the standard instruments in Vanderbilt University and the proper corrections made.

Starting from Parral, or Hidalgo as it is generally named on the maps, the road leads in a south-westwardly direction to the small mining town of Santa Barbara, at the foot of the Sierra Madre range. From this point there is no road, but merely a trail running westwardly through the small villages of Providentia, Cerro Prieta, and Piedra Larga—the two former in Durango—to the old mining town of Guadalupe y Calvo, a distance of about eighty Mexican leagues or two hundred English miles. The journey can only be made on mules, or horses accustomed to mountain travel, as there are no roads, and the trail passes over several precipitous mountains. The distances, as near as could be ascertained, are about as follows:—

	Leagues.
Parral to Santa Barbara	7
Santa Barbara to Providentia	7
Providentia to Cerro Prieta	18
Cerro Prieta to Piedra Larga	26
Piedra Larga to Guadalupe y Calvo	22

The heights going westward as determined by the barometer at the several stations mentioned, are as follows:—

	Feet.
Parral	5,880
Santa Barbara	6,490
1st Mountain	8,670
Providentia	6,850
2nd Mountain	10,220
Cerro Prieta	6,720
3rd Mountain	8,760
Cave	9,270
Valley of Rio Verde	9,110
4th Mountain	9,440
5th ,, ...	9,350
Piedra Larga	8,010
6th Mountain	9,470
7th ,, ...	9,260
Guadalupe y Calvo	7,500

The temperature in the mountains—July 10 to 31—ranged from 58° to 85°. During five days in Guadalupe y Calvo—July 20 to 25—the temperature was taken at 6 a.m., 12 a.m., and 6 p.m., and found to range from 59° to 68°. On two days—July 21 and 22—it was 65° at the time of each observation. The rainy season begins about the middle of June and extends to the 1st or middle of September. The amount of rain that falls increases towards the west. The mountains run generally S.S.E. and N.N.W., and are covered with fine timber, consisting mainly of yellow pine.

Outside of the villages mentioned there are no inhabitants except a few Indians, descendants of the Aztecs, who live chiefly in caves and cultivate small patches of corn, beans, and pepper, and have small herds of cattle. These Indians are peaceable. The Apaches once roamed through these mountains, but of late years their depredations are confined to Middle and Northern Chihuahua and Sonova.

N. T. LUPTON

Vanderbilt University, Nashville, Tenn., October 3

NOTES

MR. M. A. LAWSON, M.A., F.L.S., having been appointed Superintendent of the Government Cinchona Plantations (Madras), the Professorship of Botany at Oxford will shortly be vacant.

ALTHOUGH they have M. Cochery as their common president, the two Electrical Congresses now sitting in Paris have separate sittings, as well as separate ends. The greater number of Governments have appointed separate delegates for each. The programme for the Congress on Electric Units was already published at the end of the session of the Congress of Electricians, and adopted by them. The consequence is that the committees were established beforehand, and that some Governments, as Belgium and Italy, appointed special delegates for each committee. The total number of delegates is sixty-two. The German Empire, having the exclusive right of representing the central Government in foreign parts, no delegate has been appointed either by Bavaria or Saxony; but amongst the five German delegates we find the name of Dr. Kohlrausch, Professor at the Bavarian University of Wurzburg. After having appointed M. Cochery as president, the Congress appointed a secretariat composed of two French officials; four others, belonging to the French Administration, have been appointed as *secrétaires rédacteurs*. The records of the Congress will be published under their authority. The members of each of the several committees have appointed their president or a president and secretary, and will communicate the results of their work at general meetings. It is probable that scientific committees will be established, and that the Congress will dissolve after having appointed them, or possibly adjourn to a future occasion. The

same routine will be followed as on the occasion of the Congress of Electricians, of which this Congress must be considered as the sequel. The funds for conducting the experiments have been voted, as we reported, by the French Houses of Parliament, to the extent of 90,000 francs, but practically to any amount.

THE Congress on Cable Protection may be said to have been established in furtherance of a deliberation taken unanimously by the Congress of Electricians, but this deliberation was not acknowledged as binding by the French Government, and was not proclaimed at the time. The consequence is that the French Foreign Office caused a special programme to be drawn out after having consulted the Postal Telegraph Office and foreign governments. The schedule for the direction of the deliberation is divided into three parts:—1. The protection of cables. 2. The protection of shipping laying cables. 3. The right of property in the bottom of the sea, and rules for laying cross or parallel lines and repairing them. Although a certain number of delegates sit in both Congresses, the majority of them belong to the legal or maritime profession. The two Congresses will hold general meetings this week, and at the end of each the Minister of Postal Telegraphy will hold a levée at his official residence. The names of the British delegates are the following:—Sir William Thomson, Prof. Carey Forster, Lord Rayleigh, Prof. Fleeming Jenkin, Dr. Hopkinson, F.R.S. Cable Protection:—Mr. Kennedy, Mr. Patley, Mr. Trevor; Mr. Farnall of the Foreign Office will act as the Secretary of the British delegation.

IN a postscript to Mr. G. B. Bennett's letter to Sir J. H. Lefroy on the comet (see p. 623), the writer says:—"Since closing my letter, I have been informed that Miss North has left Wynberg for the interior. She is bent on depicting the Welwitschia. She will have to go into the Damara country to find one. I can scarcely believe that she has gone to such a distance."

A DESPATCH from Montreal, dated October 9, states that the Montreal City Council has been officially notified by the Secretary of State of the Dominion that the British Association will meet there in 1884, and has been asked that due arrangements be made.

THE French Minister of Public Instruction presided on October 11 at the inaugural sitting of a new commission created by M. Ferry, to determine the best measures for the hygiene of school children. The number of members of this commission is forty-five, amongst whom are eight females, either professional teachers or connected with the efforts made recently for promoting female education in France.

ON October 10 the Swiss Universities celebrated the fiftieth anniversary of the beginning of the scientific career of Dr. Valentin. The five Swiss Universities and no less than twenty foreign ones sent him diplomas of honour and congratulations. The health of the eminent physiologist is, however, so bad that he was confined to bed, at Geneva.

THE first provincial dinner of the Institute of Chemistry was held at the Great Western Hotel, Birmingham, on Friday, the 20th inst., and was numerously attended, both by members residing in and around this busy centre of chemical industry and by members from London. In replying to the toast of the evening, "Success to the Institute," the President, Prof. Abel, briefly traced its history. It was established to supply the want, keenly felt by the chemical profession, of an organisation to protect their interests. Its fundamental objects were the promotion of a thorough study of chemistry and the adoption of whatever measures might be necessary to advance the interests of the profession. A suitable course of training had been laid down after careful consideration and the attainment of the grade of Member and Associate was gradually coming to be regarded as a proof of fitness for election to technical, professional, or official appointments. On Friday and Saturday the members visited Earl Dudley's Iron Works, Messrs. Chance's Alkali and Glass Works, the Mint, Gas Works, &c.

MR. THOMAS COATS, of Ferguslie, Paisley, has handed over to the keeping of the Paisley Philosophical Institute an observatory erected on Oakshaw Hill, the total value of the gift being 12,000*l.*

A SUBSCRIPTION towards the English Darwin memorial has been opened in Stockholm. The Swedish press warmly supports the same, pointing out that it is not money which England asks for, but the tribute of a cultivated nation to one of her greatest *savants*.

A LETTER dated September 22 has been received by the promoter of the Danish Polar Expedition, Herr Gamel, from Lieut. Hovgaard, in which he states that the *Dijmphna* is frozen in near Novaya Zembla, but he hoped to get free during the equinoctial gales and reach the Jenisei. All was well on board.

THE Captain-General of the Philippine Islands telegraphs from Manila, October 21, that a tremendous hurricane had almost entirely destroyed that town. In less than an hour from its commencement not a single native house and not a single wooden house was left standing. Almost all the stone buildings, even those having iron rafters, were unroofed and made uninhabitable. Comparatively few casualties had taken place among the population. In a later telegram the Captain-General says that the authorities of Balacan and the interior of the island report a similar destruction as caused by the hurricane, and fifteen thousand more persons are houseless. Singularly enough, on the first day after the hurricane not a single case of cholera occurred in Manila or the island. The tornado not only swept over the entire Archipelago, but was felt many hundred miles out at sea, especially to the south and west. It is believed that more lives have been lost by shipwreck than on land.

AN interesting experiment has been made in Paris by M. Mangin, a member of the Académie d'Aérostation. A small balloon, measuring about 100 cubic feet, and filled with pure hydrogen, was sent up, being held captive by a rope containing two copper wires. A Swan incandescent light having been placed in the gas and attached to the top of the balloon, was lighted, and the whole aërial machine, which was quite translucent, was splendidly illuminated. It was shown by systematic interruptions that the dots and dashes of the Morse system could be imitated for giving military signals at a great distance.

NEWS from Verona states that the subterranean shocks continue. Houses have been destroyed by earthquakes at Cassone, Brescia, and Verona, and between Campiore and Forbefice a landslip occurred. A severe earthquake was experienced at Silchar, India, and in other districts in a lesser degree on the 13th inst.

THE Corporation of the town of Sheffield having resolved to apply to Parliament, under the Electric Lighting Act, for extensive powers for the illumination of the borough by electricity, not only in the streets and public buildings, but also in the private houses, Mr. Conrad W. Cooke, who has been appointed consulting engineer to the Corporation, has been instructed to prepare and report upon a scheme to be adopted by the Corporation.

MR. T. V. HOLMES, F.G.S., M.A.I., will read a paper on "Dene-Holes," at the meeting of the Essex Field Club to be

held at 3, St. John's Terrace, Buckhurst Hill, at seven o'clock on Saturday next, the 28th inst. The paper and the discussion thereon will have special reference to the Club's projected explorations at Grays, Purfleet, and Tilbury. Archæologists and others interested in these mysterious relics are invited to attend the meeting.

THE *New Zealand Times* of September 1 contains an account of the presentation of degrees at Wellington in connection with the New Zealand University examinations. The chair was occupied by Dr. Hector, Vice-Chancellor, who said it had been decided by the Synod of the New Zealand University that the presentation of degrees should in future be made in public. The Chancellor being unable to be present, the duty of presenting the degrees had been deputed to him. The New Zealand University had been in operation since 1870, and there had been 155 graduates, of whom forty-nine had taken degrees. This might appear a small result, but the object of the University was to raise the standard of education, and this had been done. The system of scholarships had been continued with the University course, and a large portion of the funds had been spent in this way. For some time past the examiners had been appointed in London, and the degrees granted had a value, in the eyes of the outer world, equal to those granted by the London University. Owing to its charter, the New Zealand University could not grant degrees for science, but there was every prospect that the barrier would soon be removed, Dr. Hector then referred to the disaffiliation of Wellington College, which has been converted into a high school for secondary education. The step, he said, was necessary in order that they might get a University College.

A CURIOUS project in the way of recreation, by M. Joyeux, is published in *La Nature*. Suppose a large circular wooden chamber, lit from above, but giving no view of outer objects from within, and rotated smoothly and rapidly on a vertical axis. A person standing in it would have to bend his body towards the centre, by reason of centrifugal force, and the more so the further he might be from the centre and the higher the speed. M. Joyeux supposes he would be subject to the illusion that the floor was inclined upwards from his position to the centre; if he had to place himself at an angle of 45°, the floor would seem inclined at this angle, and a person standing in the corresponding place on the opposite side would seem horizontal, for he, too, would have to make an angle of 45°. Only at the centre would the floor seem horizontal; and if a number of persons were in the chamber, it is only there one would see them in their real positions. A person walking round the circumference would seem to be at the outside of the base of a cone, which turned under him. To facilitate the position of persons, M. Joyeux would make the floor, not horizontal, but inclining upwards at a certain distance from the centre. M. Tissandier does not feel certain that the illusions described would actually occur, but regards the scheme as an attractive curiosity. The apparatus is named a *plagioscope*.

IN a recent paper to the Belgian Academy, M. van der Mensbrugghe seeks to explain the calming influence of oil on rough water, in accordance with the principle he has laid down, that whenever a liquid mass in motion acquires rapidly a free surface, more or less, there is developed a growing quantity of potential energy at the expense of the kinetic energy of the mass; and reciprocally to a rapid diminution of free surface corresponds always an increase of kinetic energy. Oil hinders the successive superposition of liquid layers, and so, the increase of the kinetic energy of the liquid mass. Floating bodies of various kinds (branches, sea-weed, ice-crystals, &c.) have a like action; immediately after the gliding of a very small number of liquid layers over them they obey the thrust that brings them to the surface, and so render impossible the increase of kinetic energy corresponding to loss of potential energy of a large number of superposed layers.

IT has been observed by M. Fredericq (*Bull. Belg. Acad.*) that the blood of crabs and other crustaceans at Ostend has the same strong and bitter taste as the sea-water, and proves to have the same saline constitution. Crabs in brackish water, on the other hand, have a less salt blood, and the crayfish of rivers have very little of soluble salts in their blood. An exchange of salts seems to take place, in these animals, between the blood and the outer medium, producing approximate equilibrium of chemical composition. This probably occurs through the respiratory organ, and is according to the simple laws of diffusion. On the other hand, the blood of sea-fishes has an entirely different saline composition from that of the water; it is more or less isolated, presenting herein an evident superiority over the invertebrates referred to.

A USEFUL complement to M. Marey's recent method of applying photography to physiological experiments (in which a bright body moving before a dark screen is photographed several times in quick succession) has been supplied by M. Ch. Petit in a process which he calls *similigravure;* whereby the photographic picture is easily reproduced for insertion in a text. Two specimens are given in *Comptes Rendus* of October 2; one of them, showing the successive attitudes of a man marching at the parade step, the other, those of a white horse, with rider, leaping over an obstacle. The process is not described; but those pictures present at a glance (M. Marey points out) much that is instructive, showing, in the former case, *e.g.* the position of different parts of the body during the step (which was executed in 6-10ths of a second).

IN the October number of *Petermann's Mittheilungen* are two papers of scientific interest: one on the Geology of the Balkan Peninsula, with map, by Prof. Franz Toula; and the other on the Distribution of the Aurora Borealis in the United States, by Prof. H. Fritz.

M. LISCH, inspector of historic monuments, has recently discovered a whole Gallo-Roman town in the environs of Poitiers. It includes a temple, 14 m. long, and with 70 m. of facade, a thermal establishment covering 2 hectares, and still possessing its piscinæ, hypocausts, pipes, flagging, &c., a theatre, the stage of which is 99 m. in width; entire streets, and more than 7 hectares of buildings (the excavations are not yet finished). "It is," he says, "a small Pompeii in the centre of France." The sculptures are in the best style, and thought to date from the second century.

THE additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii* ♂) from South Africa, presented by Mr. H. T. Hardcastle; a Common Marmoset (*Hapale jacchus*) from Brazil, presented by Miss Katie Thomason; a Common Paradoxure (*Paradoxurus typus*) from India, presented by Mr. J. Wood; a Naked-eared Deer (*Cariacus gymnotis* ♀) from Ecuador, presented by Miss Lake; an Oyster-catcher (*Hæmatopus ostragelus*), British, presented by Mr. W. R. Temple; a Maholi Galago (*Galago maholi*) from South Africa, deposited; a Ruff (*Machetes pugnax*), a Redshank (*Totanus calidris*), British, purchased; a Collared Fruit Bat (*Cynonycteris collaris*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

COMET 1882 *b* (FINLAY, SEPTEMBER 8).—The following ephemeris is deduced from the same elements as that given last week:—